

1. A method for converting a manually-operated flush valve used with a urinal or toilet, comprising the acts of:

providing a manually-operated flush valve including a valve mechanism located within a valve body constructed and arranged to control water flow between a water inlet and a water outlet, a manual handle mechanically coupled to said valve mechanism and constructed to operate said valve mechanism upon pivotable displacement;

manually causing pivotable displacement of said manual handle and thereby causing water flow between said water inlet and said water outlet;

after said manually causing pivotable displacement, providing a conversion assembly including a power module, a control module, a drive module and a displacement member;

mounting fixedly said conversion assembly relative to said valve body;

providing a mechanical coupling between said displacement member and said handle;

actuating said control module and thereby triggering said drive module constructed to displace said displacement member; and

pivotably displacing said manual handle by said displacement member to actuate said valve mechanism and cause water flow between said water inlet and said water outlet.

2. The method of claim 1 wherein said acts of mounting and positioning are performed without breaking a water seal of said flush valve.

3. The method of claim 1 performed without closing a water supply to said water inlet.

4. The method of claim 1 performed without disassembling any part of said manually-operated flush valve.

5. The method of claim 1 further including manually displacing said manually-operated handle.

6. The method of claim 1 further including manually displacing by hand touching said manually-operated handle.

7. The method of claim 1 wherein said displacement member performs a substantially linear motion when displacing said manual handle to actuate said valve mechanism.

8. The method of claim 1 wherein said displacement member performs a substantially rotational motion when displacing said manual handle to actuate said valve mechanism.

9. The method of claim 1 wherein said fixedly mounting said conversion assembly relative to said valve body includes attaching said conversion assembly directly onto said valve body.

10. The method of claim 1 wherein said fixedly mounting said conversion assembly with respect to said valve body includes attaching said conversion assembly on a wall near said valve body.

11. The method of claim 1 wherein said fixedly mounting said conversion assembly with respect to said valve body includes attaching said conversion assembly on a stationary surface near said valve body.

12. The method of claim 1 wherein said drive module includes a gear mechanism coupled to said displacement member.

13. The method of claim 1 wherein said displacement member includes a linear structure having a proximal region coupled to said gear mechanism and

a distal end shaped to provide contact with said manual handle during said pivotably displacing.

14. The method of claim 1 wherein said valve mechanism includes a  
5 diaphragm-type mechanism.

15. The method of claim 1 wherein said valve mechanism includes a piston-type mechanism.

10 16. The method of claim 1 wherein said actuating said control module includes using a sensor.

17. The method of claim 1 wherein said actuating said control module includes using an infra-red sensor.

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18. The method of claim 1 wherein said actuating said control module includes using a presence sensor.

19. The method of claim 1 wherein said actuating said control module  
20 includes using a motion sensor.

20. A method for converting a manually-operated flush valve used with a urinal or toilet, comprising the acts of:

25 providing a manually-operated flush valve including a valve mechanism located within a valve body constructed and arranged to control water flow between a water inlet and a water outlet, a manual handle mechanically coupled to said valve mechanism and constructed to operate said valve mechanism;

manually displacing said manual handle and thereby causing water flow between said water inlet and said water outlet;

30 providing a conversion assembly including a power module, a control module including a sensor, and a drive module coupled a mechanical actuator;

mounting fixedly said conversion assembly relative to said valve body;  
positioning a mechanical actuator coupled to said drive module relative to  
said manual handle;

actuating said control module by a signal from said sensor and thereby  
5 actuating said drive module constructed to displace said mechanical actuator;  
and

displacing said manual handle by action of said mechanical actuator to  
actuate said valve mechanism and cause water flow between said water inlet  
and said water outlet.

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21. The method of claim 20 further including manually displacing said  
manually-operated handle.

22. The method of claim 20 further including manually displacing by hand  
15 touching said manually-operated handle.

23. The method of claim 20 wherein said acts of mounting and positioning  
are performed without breaking a water seal of said flush valve.

20 24. The method of claim 20 performed without closing a water supply to  
said water inlet.

25 25. The method of claim 20 performed without disassembling any part of  
said manually-operated flush valve.

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26. The method of claim 20 wherein by said positioning said mechanical  
actuator coupling includes connecting said mechanical actuator to said manually-  
operated handle using a displacement member.

30 27. The method of claim 20 wherein said mechanical actuator performs  
a substantially linear motion when actuated.

28. The method of claim 20 wherein said mechanical actuator performs a substantially rotational motion when actuated.

5           29. The method of claim 20 wherein said mechanical actuator performs a rotational and linear motion when actuated.

30. The method of claim 20 wherein said fixedly mounting said conversion assembly relative to said valve body includes attaching said  
10 conversion assembly directly onto said valve body.

31. The method of claim 20 wherein said fixedly mounting said conversion assembly with respect to said valve body includes attaching said conversion assembly on a wall near said valve body.

15           32. The method of claim 20 wherein said fixedly mounting said conversion assembly with respect to said valve body includes attaching said conversion assembly on a stationary surface near said valve body.

20           33. The method of claim 20 wherein said valve mechanism includes a diaphragm-type mechanism.

34. The method of claim 20 wherein said valve mechanism includes a piston-type mechanism.

25           35. The method of claim 20 wherein said actuating said control module includes using a sensor.

36. The method of claim 20 wherein said sensor includes an infra-red  
30 sensor.

37. The method of claim 20 wherein said sensor includes a presence sensor.

38. The method of claim 20 wherein said sensor includes using a motion sensor.

39. The method of claim 20 wherein said actuating said control module includes using battery power from said power module.

40. A conversion assembly for converting an installed manually-operated flush valve used with a urinal or toilet, comprising: a power module, a control module, and a driver module arranged for mechanical coupling to a manual handle of said manually-operated flush valve.

41. The conversion assembly of claim 40 which does not include any part being in direct contact with a water passage of said manually-operated flush valve.

42. The conversion assembly of claim 40 wherein said control module includes a sensor.

43. The conversion assembly of claim 42 wherein said sensor is constructed to detect motion near said flush valve.

44. The conversion assembly of claim 42 wherein said sensor is constructed to detect presence near said flush valve.

45. The conversion assembly of claim 42 wherein said sensor is an infra-red sensor.

46. The conversion assembly of claim 40 wherein said manually-operated flush valve includes a diaphragm-type valve mechanism.

47. The conversion assembly of claim 40 wherein said manually-operated flush valve includes a piston-type valve mechanism.

48. The conversion assembly of claim 40 wherein said driver module includes a gear mechanism mechanically coupled to a displacement member having a proximal region coupled to said gear mechanism and a distal end shaped to provide contact with said manual handle.

49. The conversion assembly of claim 40 wherein said power module includes a battery and said driver module includes an electromotor, powered by said battery, and a displacement member.

50. The conversion assembly of claim 49 wherein said displacement member is constructed and arranged to move linearly when acting on said manual handle.

51. The conversion assembly of claim 49 wherein said displacement member is constructed and arranged to rotate when acting on said manual handle.

52. The conversion assembly of claim 49 wherein said displacement member is constructed and arranged to perform a combined linear and rotational motion when acting on said manual handle.

53. The conversion assembly of claim 49 wherein said displacement member is constructed and arranged to perform linear motion when acting on said manual handle.

54. The conversion assembly of claim 40 wherein said manually-operated flush valve mechanism includes a piston-type mechanism.

55. The conversion assembly of claim 40 wherein said manually-operated flush valve mechanism includes a diaphragm-type mechanism.

56. A conversion assembly for converting an installed manually-operated flush valve used with a urinal or toilet, comprising an externally mounted conversion assembly including a power module, a control module including a sensor, and a driver module mechanically coupled to a displacement member arranged to externally activate said manually-operated flush valve using a manual valve handle.

57. The conversion assembly of claim 56 wherein said driver module includes a gear mechanism coupled to said displacement member.

58. The conversion assembly of claim 56 wherein said displacement member is constructed and arranged to displace linearly when acting upon said manual valve handle.

59. The conversion assembly of claim 56 wherein said displacement member is constructed and arranged to rotate when acting upon said manual valve handle.

60. The conversion assembly of claim 56 wherein said displacement member is constructed and arranged to pivotably displace said manual valve handle.

61. The conversion assembly of claim 56 wherein said manually-operated flush valve includes a diaphragm-type valve mechanism.



62. The conversion assembly of claim 56 wherein said manually-operated flush valve includes a piston-type valve mechanism.

63. The conversion assembly of claim 56 wherein said a sensor is an  
5 ultrasonic sensor.

64. The conversion assembly of claim 56 wherein said sensor is an optical sensor.

10 65. A conversion assembly for converting an installed manually-operated flush valve used with a urinal or toilet, comprising:

a power module, a control module, and a driver module arranged for mechanical coupling to a manual handle of said manually-operated flush valve,

said driver module includes a gear mechanism mechanically coupled to  
15 displace said manual handle of a flush valve, and

said driver module being mechanically attached relative to a body member of the flush valve.

66. The conversion assembly of claim 65 wherein said driver module is  
20 mechanically attached to a shank associated with said manual handle.

67. The conversion assembly of claim 65 wherein said driver module is mechanically attached to an exterior surface of the flush valve.

25 68. The conversion assembly of claim 65 wherein said driver module is mechanically attached to a coupling nut used to attach said manual handle to a body of the flush valve.

69. The conversion assembly of claim 65 wherein said driver module is  
30 mechanically attached to a body member of the flush valve using a threading previously used to attach said manual handle to a body of the flush valve.

70. The conversion assembly of claim 65 wherein said driver module is mechanically attached to said body member of the flush valve using a bracket.

71. The conversion assembly of claim 65 wherein said driver module is mechanically attached to a displacement member constructed and arranged to displace said manual handle.

72. The conversion assembly of claim 71 wherein said displacement member is constructed for linear movement.

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73. The conversion assembly of claim 71 wherein said displacement member is constructed for rotational movement.

74. The conversion assembly of claim 71 wherein said displacement member includes a drive shaft and a cam.

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75. The conversion assembly of claim 74 wherein said cam includes an engagement surface cooperatively arranged with the shape of said manual handle.

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76. The conversion assembly of claim 74 wherein said cam includes an engagement surface includes an involute surface for engaging said manual handle.

77. The conversion assembly of claim 71 wherein said displacement member includes a drive shaft and a cam coupled by a clutch mechanism.

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78. The conversion assembly of claim 77 wherein said cam includes an engagement surface cooperatively arranged with the shape of said manual handle.

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78. The conversion assembly of claim 71 wherein said displacement member includes a drive shaft and a cam.

79. The conversion assembly of claim 65 wherein said manually-operated flush valve includes a diaphragm-type valve mechanism.

80. The conversion assembly of claim 65 wherein said manually-operated flush valve includes a piston-type valve mechanism.

81. A conversion assembly for converting an installed manually-operated flush valve used with a urinal or toilet, comprising:

a power module, a control module, and a driver module arranged for mechanical coupling to a manual handle of said manually-operated flush valve,

said power module includes a battery,  
said driver module includes an electromotor powered by said battery, and  
said control module includes a motion sensor.

82. The conversion assembly of claim 81 further including a displacement member.

83. The conversion assembly of claim 82 wherein said displacement member is constructed for rotational movement.

84. The conversion assembly of claim 82 wherein said displacement member includes a drive shaft and a cam.

85. The conversion assembly of claim 84 wherein said cam includes an engagement surface cooperatively arranged with the shape of said manual handle.

86. The conversion assembly of claim 84 wherein said cam includes an engagement surface includes an involute surface for engaging said manual handle.

5           87. A conversion assembly for converting an installed manually-operated flush valve used with a urinal or toilet, comprising an externally mounted conversion assembly including a power module, a control module including a sensor, and a driver module mechanically coupled to a displacement member arranged to externally activate said manually-operated flush valve using  
10 a manual valve handle.